IMPACT OF ARTIFICIAL INTELLIGENCE ADOPTION ON EUROPEAN EMPLOYMENT (2023-2024)

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INTRODUCTION

The rapid emergence of **artificial intelligence (AI)** is generating intense debate about its **potential impact on the labor market** . This study empirically analyzes how the corporate adoption of AI has affected different **economic sectors and occupational groups** in Europe in recent years. In this context, the following questions are raised:

- **Main objective:** To empirically analyze the differential impact of AI adoption on employment distribution by sectors and occupations in Europe.
- **Hypothesis:** AI adoption will have a heterogeneous effect on employment depending on the type of predominant tasks.

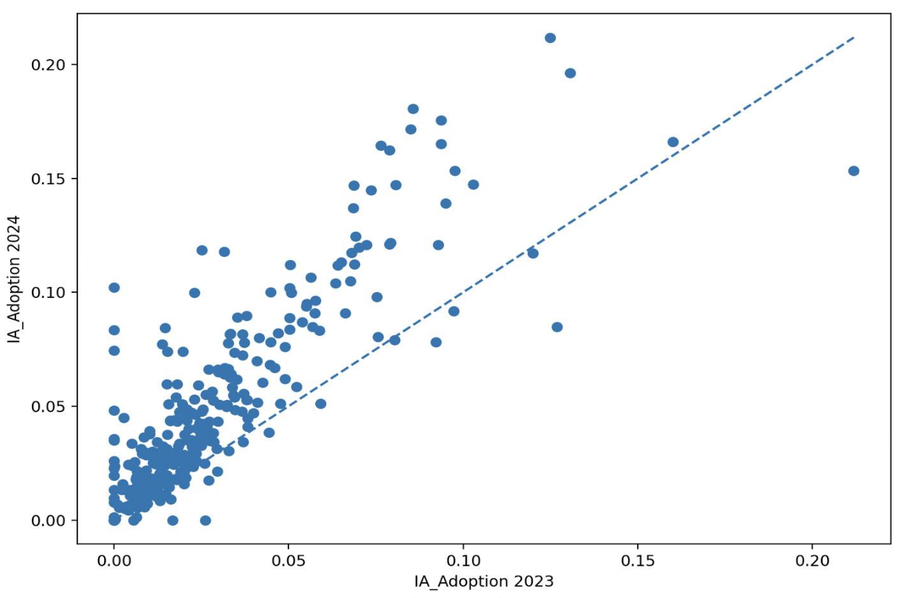

Figure 1. Comparison of AI adoption by period (2023 vs 2024)

METHODOLOGY

This analysis is based on recent data (**2023-2024**) from Eurostat for **29 European countries** . It combines the **degree of business adoption of AI** in each country and economic sector with data on the structure of employment by sector and occupation (**NACE Rev. 2 and ISCO-08 classifications, respectively**).

The econometric methodology employed consists of **panel models with country and year fixed effects** . In addition, key macroeconomic control variables (**GDP per capita, education level, and unemployment rate**) are included to isolate the specific effect of AI adoption on the structure of employment.

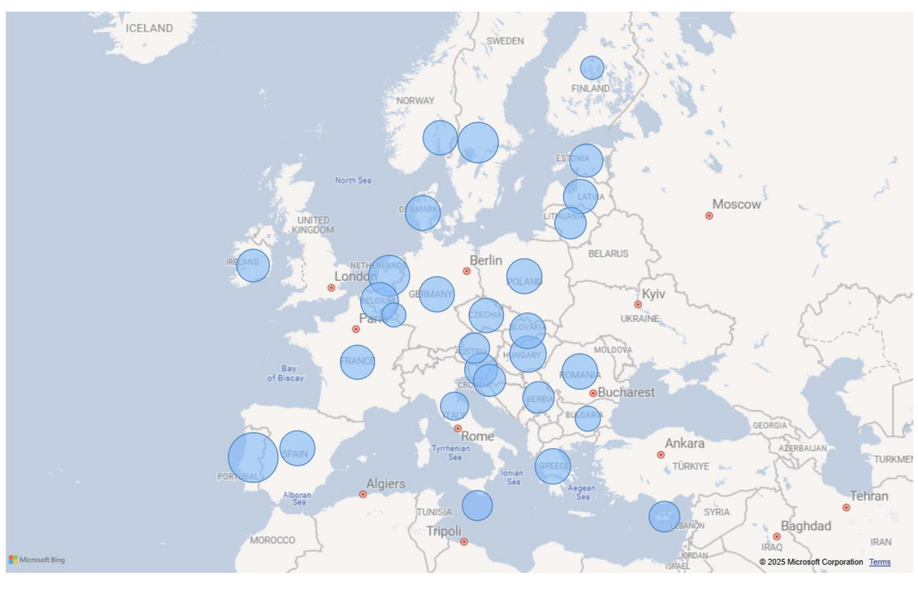

Figure 2. Distribution of AI adoption observations by country (2023-2024)

RESULTS

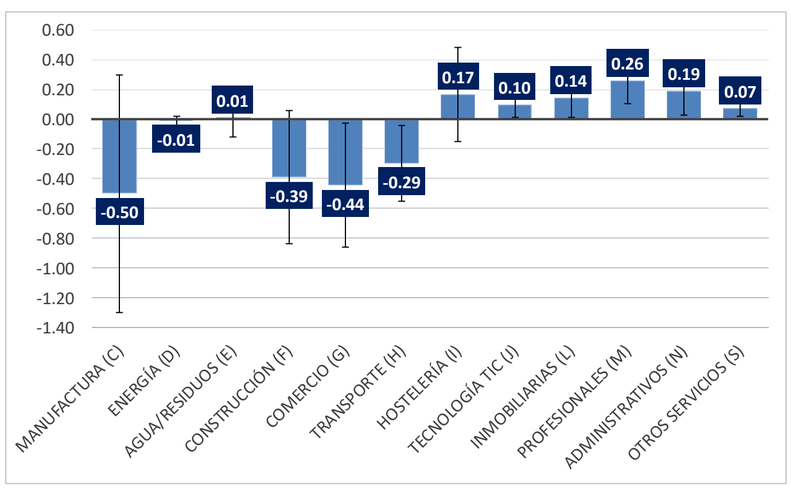

Figure 3. Effects of AI adoption on **sectoral** employment share (Confidence interval: 95%)

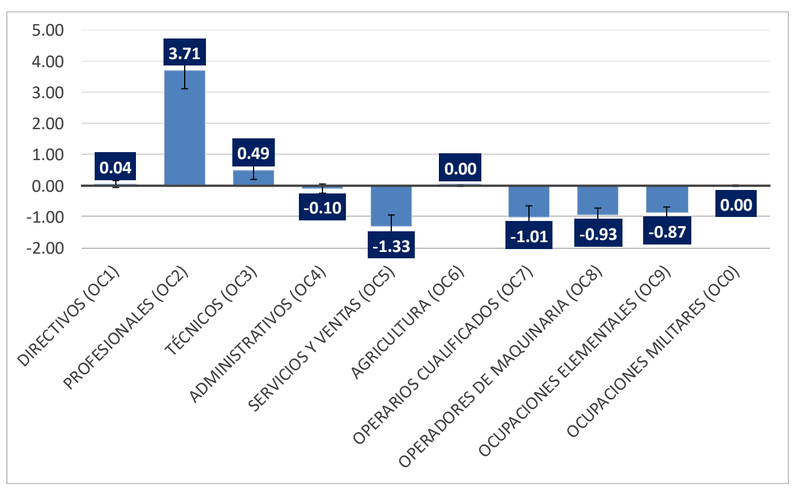

Figure 4. Effects of AI adoption on **occupational** employment share (Confidence interval: 95%)

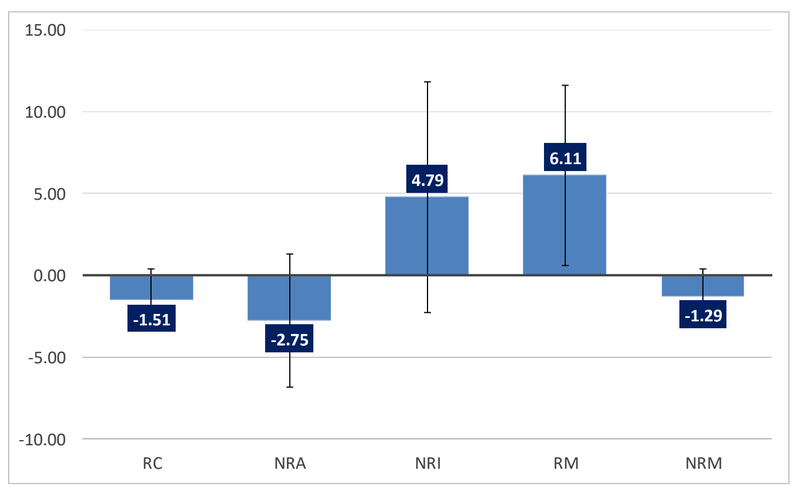

Figure 5. Effects of AI adoption according to the sub-task intensity index (Mihaylov and Tijdens 2019) (CI: 95%)

Figure **3 shows a positive** association in the **relative employment** of mostly intensive sectors. in **non-routine tasks** . In contrast, sectors with **more routine** and lower-skilled tasks experience significant **declines** in their relative share.

Figure **4** reveals that highly skilled occupations **increase** their relative weight with increasing AI adoption. Conversely, **lower-skilled occupations** tend to **decrease** their relative share.

Figure **5** highlights an unexpected result where **routine manual tasks show positive** associations with greater AI adoption, **contrary** to what **classical** automation theories predict.

CONCLUSIONS AND FUTURE WORK

Empirical analysis confirms that AI adoption has **differentiated effects on the structure of European employment** , acting primarily as a complement in high-skill sectors and occupations intensive in advanced cognitive tasks. However, **evidence was found that contradicts the classic theory** of routine vs. non-routine tasks, suggesting a **possibly different pattern than previous technological advances** .

Key findings:

- **Heterogeneous impact** according to type of economic sector and occupational hierarchical group.
- AI favors sectors intensive in **advanced cognitive skills and highly qualified** jobs .
- **Routine vs. non-routine task theory** is **insufficient** to explain the observed heterogeneity.

Future lines of research:

- **Extend the time horizon** of the analysis to evaluate long-term effects and obtain more robust results.
- Conduct a study with **microeconomic employment data to detect direct causal** relationships .
- **Detailed research** on the conditions under which **routine tasks** can **be complemented with AI** .